5.0 The Pipeline Risk Analysis Report

The intent of the Protocol is to bring consistency to risk analyses. This section discusses the Pipeline Risk Analysis Report in terms of a concise format based on standard reporting forms.

5.1 Report Contents

The risk analysis report must contain sufficient information to allow the CDE School Facilities Planning Division to evaluate the analysis in light of the site setting, subject pipeline characteristics, and site population characteristics.

Information should cover the following categories:

- The name and address of the LEA submitting the analysis;
- The name and description of the site;
- Pipeline characteristics and location relative to the site;
- A map showing the site boundaries, the 1500 ft boundary zone measured from the site property line, and the subject pipeline(s) location within the 1500 ft zone;
- Documentation of key assumptions and risk analysis calculations; and
- Results of the risk analysis compared with the risk decision criteria.

A standard reporting format has been established which consists of three parts:

- A transmittal letter, the exact form of which is left to the discretion of the individual LEA;
- A set of standard reporting forms, that constitute the key elements of the report; and
- A provision for any supplementary information a LEA elects to attach to the form.

5.2 Standard Report Forms

Standard report forms are provided to facilitate the recording data and reporting results of the risk analysis.

The standard forms are the:

1) Form 1 - Pipeline Risk Analysis Administrative, Summary, and Signature Form;

2) Form 2 - Pipeline Risk Analysis Input Data;
3) Form 3 - Pipeline Risk Analysis Standard Protocol Calculation Summary;
4) Form 4 – Pipeline Risk Analysis Alternative Calculations Summary; and
5) Form 5 - Pipeline Risk Analysis Other Supporting Documentation.

Each form is described below and a copy of each follows the discussion.

5.2.1 Form 1 - Risk Analysis Administrative and Summary Report

This form is intended as the cover form for the submittal. It is the first page of the multi-page forms' package. It is a compilation of the:

- Submitting LEA data, including contacts;
- Site description;
- Pipeline description(s);
- Risk analysis result, expressed as an individual risk value; and
- Signatures and titles of the persons responsible for preparing and approving the risk analysis report.

Guidance is currently provided in the data entry boxes of the right-hand column where deemed necessary.

The degree of completeness of the forms will depend on whether the analysis is Stage 1, 2, or 3.

5.2.2 Form 2 - Risk Analysis Input Data

The data input form provides information on the proposed school campus site and the pipeline conditions for which the risk analysis applies. It identifies the product(s) carried by the pipeline and other pipeline attributes. In the case of multiple pipelines, an individual data input form would be provided for each individual pipeline.

Local Educational Agency Data

Enter the LEA and the proposed school site names in the appropriate boxes. The protocol will accept a brief description, and if available, a cross reference to the Phase I or other study to avoid spending effort in replicating site descriptions and site maps.

Product

Check the appropriate box. The form specifies the substances most likely to be encountered in pipelines near schools. The most common materials include natural gas, crude oil and refined petroleum products. Several other common flammable substances are also specifically listed. For other substances, the person filling out the form should check the appropriate box and specify the "other" material by name.

Pipeline Attributes

Enter the subject pipeline attributes in the appropriate boxes. The determination of the segment length within the 1500-ft applicability zone and the other distances required in the form were discussed in Section 4 of this protocol.

Segment Length – Enter the length of the pipeline segment in feet within the 1500-ft applicability zone.

Closest Approach to Property Line – This is the shortest distance between the centerline of the pipe and the nearest approach of a property line to the pipe or the usable portion of the school site, which might apply in some cases, as determined by CDE. This is the same distance used as the basis when estimating the IR at the property line.

Diameter – Specify the inside or nominal diameter of the pipeline in inches. Data on the pipeline operator in public records or information in the Phase I Environmental Assessment Report will usually, but not always, have this information.

Maximum Operating Pressure (MOP) – The maximum operating pressure is the maximum pressure for which operation is allowed. Conservatively this pressure can be used in the risk analysis. The pressure is specified in units of pounds per square inch gage (psig) pressure. This information will also usually be found in the public record of operating permits or other pipeline records. It will also usually, but not always, be found in a Phase I Environmental Assessment Report.

Depth of Burial – The depth of burial should be the average for the segment, in feet. This information is only used qualitatively in deciding whether the average release probability value for a segment, derived from overall system information, could be increased or decreased according to whether the segment is deeper (decrease) or shallower (increase) than 36 inches.

Product Throughput – The product throughput is used in estimating potential release rates for liquid pipelines after a large breach in the pipe after initial draindown and before pumps can be shut off or block valves closed. Product throughput is not relevant for natural gas pipelines.

Pipeline Location on Terrain Gradient Relative to School – Terrain considerations are an especially important consideration for liquid pipeline releases, as explained elsewhere in this protocol document. For a Stage 1 or Stage 2 analysis, three designations of terrain between potential release points on a pipeline segment and the site are suggested: flat, up gradient and down gradient. Check the appropriate box. For gas releases, there might be an increased threat to a site if the site is significantly elevated relative to the pipeline location. The buoyancy of natural gas might bring a hazardous gas cloud into closer proximity to the site than if the site were at the same elevation or somewhat below the gas pipeline. This would not apply to other gases that might be heavier than air, and might not apply even to natural gas under some meteorological and release orientation conditions.

5.2.3 Form 3 - Pipeline Risk Analysis Standard Protocol Calculation Summary

This form shows the IR documentation. It summarizes key information associated with the IR calculations.

5.2.4 Form 4 - Pipeline Risk Analysis Alternative Calculations

From 4 serves as a cover page for the submission of alternative calculations documentation for those cases where the analyst elects to use methods other than the standard protocol for the risk estimate. This would be where documentation for a Stage 3 Analysis would typically be provided.

5.2.5 Form 5 - Pipeline Risk Analysis Other Supporting Documentation

This form is a cover page for any other supporting documentation submitted for the risk analysis. Additional information can be provided at the discretion of the LEA as appropriate. Such information might include such things as qualitative information as to why the LEA believes the site to be satisfactory, more explanation of proposed prevention and mitigation measures and the like. A Stage 3 analysis would contain a significant amount of supplementary information.

5.3 Maps

Maps of the type used in a Phase 1 Environmental Assessment or geohazards report, with an indication of the pipeline(s) location(s) relative to the school campus site boundaries, should be part of the submission package. The maps could also show impact circles from the various scenarios evaluated for IR and the zone boundaries for the PRI evaluation.

5.4 Mitigation

A discussion of mitigation measures for risk control or reduction should be provided to support the listings provided appropriately in the above forms. Mitigation by prevention of product releases from a pipeline is largely outside the control of a LEA. Mitigation will usually focus on communications and limiting the potential impacts of a release should one occur. Emergency planning and preparedness for specific types of scenarios should be incorporated into the overall site emergency planning. Examples of the kinds of mitigation measures that might be considered for implementation include the following:

- Consider alternative locations.
- Design the site layout to minimize impacts and provide for sheltered areas for the various scenarios that might occur.
- Manage the occupancy patterns and times for site populations.
- Consider small shelter locations against fire radiation at various sites in the areas of school property away from the buildings.
- Design buildings to minimize glass toward the pipeline right of way, and design buildings for high structural integrity.
- Avoid the use of wooden buildings.
- Develop and install emergency alarm systems and integrate into emergency planning and drills.
- Maintain close communications with the pipeline operator and monitor activity near the pipeline.
- Be prepared to notify the operator immediately of any excavation or drilling activity near the pipeline.
- Ask to be notified by the operator about any excavation or maintenance activities near or on the pipeline; ask to be informed of any one-call system notifications on the segment of line within the 1500-ft zone.
- Provide mini-shelters in vulnerable areas of the property.
- Provide for immediate shut-off of ventilation from outside air in the event of a pipeline incident.
- Provide berms or walls to prevent liquid from moving onto the site or to protect against heat and flame (provided that such design is properly analyzed for secondary hazard effects).

These are examples only and other measures can be considered. Some of these potential measures may not be practical in all cases. Also, LEAs should take every opportunity to develop close working relationships and communications with the pipeline operators in their areas, as a means to enhance pipeline safety.

In some cases, it may be possible to quantify the effects of mitigation measures. However, when not quantifiable, the professional opinion of the risk analyst will be required to estimate if the effects of the mitigation measures will result in the Protocol's IR Criterion being met.

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 1 – Administrative, Summary, and Signature Form

Local Educational Agency						
Date						
Local Educational Agency	(Enter full name of LEA)					
Contact	(Enter name of key contact person, first and last name at least.)					
Telephone Number						
E-mail Address						
Street Address						
Department or Mail Drop						
City						
County						
Zip Code						
Proposed School Campus Site						
Name	*(Enter name of school site identifier.)*					
Location Description	*(Enter a brief description of the property and its boundaries. Copy and attach a more detailed description as needed, for example from the Phase I study or other source. Refer to it if needed.)*					
Pipeline of Interest						
Operator / Owner	*(Enter name of local pipeline operating entity and owner if they differ.)*					
Product Transported	*(Enter name of product using same name as in listing.)*					
Pipeline Diameter (inches)	*(Enter pipeline segment diameter in inches.)*					
Operating Pressure (psig)	*(Enter pipeline-operating pressure used in analysis in psig.)*					
Closet Approach to Property Line (or boundary between the usable and unusable portion of the site if the unusable portion faces the pipeline.) (ft)	*(Enter value in feet.)*					
Individual Risk Estimate Result						
Type of Analysis (Check One)	**Stage 1 →**		**Stage 2 →**		**Stage 3 →**	
Individual Risk Estimate Value						
Individual Risk Criterion	**1.0E-06 (0.000001)**					
IR Significance (check one)	**Significant**					
	Insignificant					

(Continued on next page)

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 1 – Administrative, Summary, and Signature Form
(Continued from previous page)

Population Risk Indicator Result	
Protocol Average IR	
IR Indicator (Average IR / Property Line IR Ratio)	
Population Risk Indicator	

Prevention and Mitigation Recommendations/Implementations *(Add additional sheets with more details as needed.)*
Prevention Measures:
Mitigation Measures:
Conclusions/Other Suggestions/Recommendations *(Add more sheets, if needed.)*

Certification and Signatures of Risk Analyst(s)

This analysis was conducted according to the 2007 CDE Protocol except as noted. All modifications within the Stage 2 framework, and Stage 3 analyses and exceptions to the data and processes established in the 2007 CDE Protocol, if any, were based upon my professional opinion and in a manner consistent with the standards of care and skill ordinarily exercised by professionals working on similar projects.

I certify that the estimated risk levels were derived based upon the 2007 CDE Protocol, unless otherwise noted, and that these levels demonstrate, within reasonable expectations of uncertainties for such estimates, that the estimated Individual Risk for the school site, as the site was planned at the time of this analysis, including mitigation measures, if any, meets the Individual Risk Criterion stated in the 2007 CDE Protocol, based on the information provided to me.

Printed Name	**Signature**	**Position or Title**

Notice: In the event that the Individual Risk Criterion could not be met, at the option of the LEA, CDE will still accept a report for review and consultation with the LEA.

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 2 - Pipeline Risk Analysis Input Data

Date:		
Local Educational Agency:		
Proposed School Site Name:		
Proposed School Estimated Population:		
Product	*Designate by an "X"*	
Natural gas (NG)		
Crude oil		
Gasoline		
Liquefied natural gas (LNG)		
Liquefied petroleum gas (LPG)		
Natural gas liquids (NGL)		
Other refined product (specify)		
Other substance (specify)		
Pipeline Location Attributes	**Units**	**Value**
Segment length	ft	
Closest approach to property line	ft	
Closest approach to usable portion of the school site	ft	
Land use by class location (49 CFR Part 192)	Class	
Pipeline Attributes		
Diameter	inches	
Maximum operating pressure	psig	
Average operating pressure	psig	
Depth of burial	ft	
Distance to nearest compressor (gas) or pump station (liquid)	ft	
Throughput		
Liquid (enter value, meter, etc.)	gpm	
Nearest block valve locations, upstream and downstream of segment of concern		
Above ground components within 1500-ft zone		
Number		
Type		
Pipeline location on terrain gradient relative to school (Designate with an "X" by appropriate description)		
Flat		
Up gradient		
Down gradient		
"Convoluted"		

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 3 - Standard Protocol Calculation Summary

	Release Probability Calculations	Variable	Value	Data Source if Different from Protocol
Basic Data Input				
	Baseline frequency per pipeline mile	F0, releases/ mile-year		Historical or default release frequency from Table 4-3 or Appendix B.
	Segment length within 1500-ft buffer	SEG, Miles		Determine from site maps, GIS, or other sources
	Nearest property line distance	R0, ft		Determine from maps
	Receptor location distance, if different than nearest property line	R(i), ft		Determine from maps
	Base release probability	P0		$P0 = 1 - e^{(-F0 \times t)}$
	Probability adjustment factor	PAF		Default value selected by analyst
	Adjusted base probability	PA		$PA = P0 \times PAF$
Special Seismic Considerations				
Please summarize and/or list below any adjustments made to the Protocol base risk analysis estimates and the special seismic conditions and studies upon which these adjustments were based. If adjustments were based upon special seismic conditions, the signature(s) and titles of those professionals involved are required. Attach additional pages if needed.				
Signatures for Above, If Needed				
Printed Name		**Signature**		**Title**
Protocol Basis Scenario Probabilities				
	XSEG length, leak, ft:			
	Leak jet or pool fire			
	Leak flash fire			
	Leak gas or vapor explosion			

(Continued on next page.)

	Release Probability Calculations	Variable	Value	Data Source if Different from Protocol
	Individual XSEG failure and release probabilities, leak, PA(LX):			
	Leak jet or pool fire			
	Leak flash fire			
	Leak gas or vapor explosion			
	XSEG length, rupture, ft:			
	Rupture jet or pool fire			
	Rupture flash fire			
	Rupture gas or vapor explosion			
	Individual XSEG failure and release probabilities, rupture, PA(RX):			
	Rupture jet or pool fire			
	Rupture flash fire			
	Rupture gas or vapor explosion			
Insert Protocol default values or exceptions to the Protocol default values:				**(If values other than Protocol default values were used, indicate the value in the appropriate cell and indicate the data source.)**
	Probability of leak	PC(L)		Default: 0.8
	Probability of rupture	PC(R)		Default: 0.2
	Probability of leak ignition	PC(LIG)		Default: gas 0.3 (FEMA 1989); gasoline, 0,09; liquids other than gasoline (e.g., crude oil): 0.03
	Probability of rupture ignition	PC(RIG)		Default: gas 0.45 (FEMA 1989); gasoline: 0.09; liquids other than gasoline (e.g., crude oil): 0.03

(Continued on next page)

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 3 - Standard Protocol Calculation Summary
(Continued from previous page)

	Release Probability Calculations	**Variable**	**Value**	**Data Source if Different from Protocol**
Insert Protocol default values or exceptions to the Protocol default values:				**(If value other than default used, indicate value in appropriate column and indicate data source.)**
	Probability of fire on ignition	PC(FIG)		Default: gas 0.99 (FEMA 1989); liquid 0.95
	Probability of explosion on ignition	PC(EIG)		Default: gas 0.01; liquid 0.05
	Probability of flash fire	PC(FF)		Default: gas 0.01; liquid 0.05
	Probability of jet fire (gas pipelines) or pool fire (liquid pipelines)	PC(JF)		Default: gas = 0.98; liquid = 0.95
	Probability of occupancy	PC(OCC)		Default: 180 days per year, 8 hrs per day.
	Probability of outdoor exposure	PC(OUT)		Default: 2 hr outdoors during an 8-hour day onsite.
	Probability of leak jet/pool fire impact	PCI(LJF)		
	Probability of rupture jet/pool fire impact	PCI(RJF)		
	Probability of leak flash fire impact	PCI(LFF)		
	Probability of rupture flash fire impact	PCI(RFF)		
	Probability of leak explosion impact	PCI(LEX)		
	Probability of rupture explosion impact	PCI(REX)		
Individual Risk Summary				
	Leak jet fire IR	IR(LJF)		
	Rupture jet fire IR	IR(RJF)		
	Leak flash fire IR	IR(LFF)		
	Rupture flash fire IR	IR(RFF)		
	Leak explosion IR	IR(LEX)		
	Rupture explosion IR	IR(REX)		
Total IR and IRC				
	Total Individual Risk			
	CDE Individual Risk Criterion		**1.0E-06**	
Check shaded boxes as follows:				
	If TIF / IRC > 1.0			“Significant”
	If TIF / IRC < =1.0			“Insignificant”
IR and Population Risk Indicators				
	IR Indicator			
	Population Risk Indicator			

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 4 - Alternative Calculations Summary

School Site:
Listing of Attached Alternative Documentation:

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 5 - Supplementary Documentation

School Site:
Listing of Attached Supplementary Documentation:

6.0 General and Cited Protocol References

This list contains both a general bibliography of pertinent technical literature and references specifically cited in the Protocol, both Volumes 1 and 2.

(Acton 2000) M.R., Hankinson, G., Ashworth, B.P., Mohsen Sanai and James D. Colton, "A Full Scale Experimental Study of Fires Following the Rupture of Natural Gas Transmission Lines," ASME Conference Proceedings, 2000.

(AIChE 1995) Design Institute for Physical Property Data (DIPPR), American Institute of Chemical Engineers (AIChE), given in DIPPR computer software, Version March 1995, Technical Database Services, Inc.

(ASME 2002) B31.8S 2001, Supplement to B31.8 on Managing System Integrity of Gas Pipelines. ASME International, New York, New York, January 31, 2002.

(Baker 1983) Baker, W. E., P. A. Cox, P. S. Westine, J. J. Kulesz, and R. A. Strehlow. *Explosion Hazards and Evaluation.* Elsevier Scientific Publishing Company, Amsterdam – Oxford – New York, 1983.

(Bass-Trigon 2002) Bass Trigon Software, (web site: http://www.bass-trigon.com) (2002).

(Boucher 1963) Boucher, D.F. and G.E. Alves, "Fluid and Particle Mechanics," in *Chemical Engineers' Handbook*, 4th ed., R. H. Perry, C.H. Chilton, and S.D. Kirkpatrick, eds., McGraw-Hill, New York, 1963.

(CPUC 2000) California Public Utilities Commission (CPUC) web site, http://www.cpuc.ca.gov, 2000.

(CSFM 2002) California State Fire Marshall's Office. Personal Communication, March 2002.

(CCPS 1989) Center for Chemical Process Safety (CCPS), *Guidelines for Chemical Process Quantitative Risk Analysis*, American Institute of Chemical Engineers, New York, New York, 1989.

(CCPS 1992) Center for Chemical Process Safety (CCPS), *Guidelines for Hazard Evaluation Procedures,* American Institute of Chemical Engineers, New York, 1992.

(CCPS 1993) Center for Chemical Process Safety (CCPS), *Guidelines for Chemical Transportation Risk Assessment*, American Institute of Chemical Engineers, New York, 1995.

(CCPS 1994) Center for Chemical Process Safety (CCPS), *Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and BLEVES*, American Institute of Chemical Engineers, New York, 1994.

(CCPS 1996) Center for Chemical Process Safety (CCPS), *Guidelines for Evaluating Process Plant Buildings for External Explosions and Fires*, American Institute of Chemical Engineers, New York, New York, 1996.

(Crocker 1988) Crocker, W.P. and D.H. Napier, "Mathematical Models for the Prediction of Heat radiation from Jet Fires," I. Chem. E. Symposium Series No. 110:331-347, 1988.

(de Nevers 1991) de Nevers, Noel, *Fluid Mechanics for Chemical Engineers*, Second Edition, McGraw-Hill, Inc., 1991.

(Eltgroth, 1995) Eltgroth, Mark W., "CHARM® Emergency Response System Technical Reference Manual," Radian Corporation, September 1995.

(FEMA 1989) FEMA, DOT, and EPA, *Handbook of Chemical Hazards Analysis Procedures*, US Environmental Protection Agency, US Department of Transportation, and the Federal Emergency Management Agency, 1989.

(GRI 2000) Gas Research Institute, *A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines*, GRI-001 0189, October 2000.

(Greenwood 1997) Greenwood, B., L. Seeley, and J. Spouge, "Risk Criteria for Use in Quantitative Risk Analysis," in CCPS, International Conference and Workshop on Risk Analysis and Process Safety, October 21-24, 1997, Atlanta, Georgia, American Institute of Chemical Engineers, New York, New York, 1997, pp. 29-40.

(Haklar 1999) Haklar, J.S. and Dresnak, R., New Jersey Institute of Technology (Re: Natural gas fire modeling, exact title unknown), Journal of Pipeline Safety, Autumn, 1999.

(HSE 1986) HSE, "The Effect of Explosions in the Process Industries," *Loss Prevention Bulletin*, 68:37-47, Health & Safety Executive (HSE), 1986.

(HSE 1979) HSE, *Second Report Advisory Committee Major Hazards*, U.K. Health and Safety Commission, Health & Safety Executive (HSE), 1979.

(Lees 1996) Lees, Frank P., *Loss Prevention in the Process Industries*, Second Edition, 1996.

(Liepmann1967) Liepmann, H. W. and A. Roshko. *Elements of Gas Dynamics*. John Wiley & Sons, Inc., New York – London – Sydney, 1967.

(McAllister 1993) McAllister, E.W. (ed), *Pipeline Rules of Thumb Handbook,* Gulf Publishing Co., Houston, Texas, 1993, pp. 497-501.

(Muhlbauer 1996) Muhlbauer, W.K., *Pipeline Risk Management Manual*, Second Edition, Gulf Publishing Co., Houston, TX, 1996.

(Muhlbauer 2004) Muhlbauer, W.K., *Pipeline Risk Management Manual*, Third Edition, Gulf Publishing Co., Houston, TX, 2004.

(NCDC) National Climatic Data Center (NCDC) web site, http://lwf.ncdc.noaa.gov/oa/ncdc.html.

(NFPA 1984) NFPA, "Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids", NFPA 325M, National Fire Protection Association, Batterymarch Park, Quincy MA, 1984.

(Radian 1995) Radian International, CHARM® Technical Manual, 1995.

(SBC 1999) Santa Barbara County, "Public Safety Thresholds", August 17, 1999.

(SRI 2002) Stanford Research Institute, Personal Communication, May, 2002.

(Taylor 1946) Taylor, G. I., "The Air Wave Surrounding an Expanding Sphere." Proceedings Roy. Soc , pp. 273-292, 1946.

(USDOC 2000) U.S. Department of Commerce (US DOC), "Heat radiation from Large Pool Fires" NISTIR 6546, Fire Safety Engineering Division Building and Fire Research Laboratory, November 2000.

(DOT-OPS) United States Department of Transportation Office of Pipeline Safety (DOT-OPS), Gas Pipeline Incident Database, 1984-2001, and Hazardous Liquid Incident Database, 1986-2001.

(DOT-OPS 2000) United States Department of Transportation Office of Pipeline Safety (DOT-OPS), 2000 Annual Reports for Natural Gas Transmission and Distribution Pipeline Operators.

(EPA 1990) United States Department Of Transportation, Research and Special Programs Administration, 49 CFR Part 192, [Docket No. RSPA-00-7666; Amendment 192-95] RIN 2137-AD54, Pipeline Safety: *Pipeline Integrity Management in High Consequence Areas (Gas Transmission Pipelines)*, ACTION: Final rule.

(EPA 1990) United States Environmental Protection Agency (EPA), *Evaluation of Dense Gas Simulation Models*, Draft, EPA 450/4-90, United States Environmental Protection Agency, September 1990.

(EPA 1999a) United States Environmental Protection Agency (EPA), *Risk Management Program Guidance for Offsite Consequence Analysis (OCAG)*, EPA 550-B-99-009, United States Environmental Protection Agency, April 1999.

(EPA 1999b) United States Environmental Protection Agency (EPA), TANKS 4.09b, computer program. US Environmental Protection Agency, September 1999.

(EPA 2006a) United States Environmental Protection Agency (EPA), ALOHA® (Areal Locations of Hazardous Atmospheres), User's Manual, United States Environmental Protection Agency, Office of Emergency Management, Washington, D.C. and National Oceanic and Atmospheric Administration, Office of Response, Seattle, Washington, February 2006

(EPA 2006b) United States Environmental Protection Agency (EPA), Download of ALOHA, Version 5.4, http://www.epa.gov/ceppo/cameo/request.htm. Accessed September 2006.

.

Special State of California regulatory agency contacts: See Appendix G.